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ABSTRACT

Described are the steps involved in revising the Peabody Mobility Scale (PMS), an instrument for assessing the orientation and mobility skills of multiply handicapped blind children. Among the revision procedures discussed are a redefinition of item content for mobility and prerequisite skills, and alteration of the format to that of an easily administered criterion referenced framework. An example of the revised PMS walking assessment is included, as well as a review of interrater-reliability and predictive validity statistics. (CL)

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THE DEVELOPMENT OF THE REVISED PEABODY MOBILITY SCALE

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During the Peabody Mobility Project's pilot research (Harley, Wood, and Merbler, 1975), the Peabody Mobility Scale (PMS) was found by the investigators to be a useful instrument for assessing the orientation and mobility skills of multiply impaired blind children. The Scale yielded reliable information on a child's developmental level in several behaviors related to independent travel. Furthermore, the overall structure of the Scale (i.e. division into four discrete behavioral domains of motor, sensory, concept and mobility) seemed functional. However, after extensive experience administering this original instrument, the investigators decided that several aspects of the PMS could benefit from substantial revisions. These revisions centered on item content, developmental ordering of the items and scoring format and were designed to increase the Scale's breadth, accuracy and ease of administration.

The first step in developing the revised edition of the Peabody Mobility Scale was to redefine the scale's item content. Content redefinition occurred in two phases. The first phase dealt exclusively with the mobility section of the Scale. Information for revising the content of the mobility section of the PMS came from three sources: the research literature on orientation and mobility; direct, informal observation of lower functioning children who were proficient travelers to determine what mobility skills they demonstrated; and the joint experience of the investigators in providing mobility instruction to low functioning children.

Through these sources of information six basic orientation and mobility skills were identified. These skills included: 1) sighted guide; 2) seating;

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3) trailing; 4) turning and maintaining orientation; 5) utilization of discriminable landmarks and 6) environmental travel. These six basic skills comprise the Mobility Section of the Revised PMS.

The second phase of the redefinition of the item content of the PMS pertained to the prerequisite skill domains, specifically, the motor, sensory and concept sections of the original scale. Inputs for these revisions included the research literature and task analysis of the criterion behaviors essential for independent travel. Table 1 summarizes the final product of these revisions and presents the complete item content of the revised PMS.

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insert table 1 about here

The second step in developing the revised edition of the PMS was to translate the identified content of the Scale into an assessment format. The format for the revised PMS was designed to adhere to four guidelines. The first guideline was that the Scale would be a criterion referenced instrument with scores based on direct observation of the behaviors of interest. The primary concern when using the criterion referenced approach, is whether the child performs a specified behavior with an acceptable level of proficiency rather than how well he performs a behavior relative to his peers.

The second guideline was to devise a scale which could be administered with minimal verbal interaction between the examiner and the child. Consequently, whenever practical, a "match to sample" response mode was adopted to provide a child without expressive language a non-verbal means of communicating his response. This provision for a non-verbal response mode was crucial if the Scale was to be suitable for lower functioning children.

The third guideline was that the items would be arranged in developmental order with each item partitioned into five developmentally sequenced subitems. The goal of this guideline was achieved through task analyzing each of the items and consulting relevant literature on the developmental progression of the behavior to be assessed.

The fourth guideline was to develop an instrument which could be administered easily by teachers or parents. Consequently, very explicit instructions were provided and the criterion behaviors for passing each subitem were clearly defined in observable terms.

An example of the final product of this developmental effort, the revised PMS, is presented in table 2.

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insert table 2 about here

Table 2 presents an item selected from the motor section of the revised PMS. The number code (e.g. 1.4.1.P.) provides an index of the item's location in the scale. The first digit is the scale section (1 = Motor, 2 = Sensory, 3 = Concept, 4 = Mobility), the second digit is the item's sequential position within a section, the third number denotes the particular subitem of an item, and the letter (P or S) denotes whether an instruction describes an administration procedure or a scoring criterion. The administration procedures are carefully described for each item and subitem, including position of the examiner and the child, context, materials, and presentation procedures. In the scoring section, the criterion behavior is precisely defined and a scoring grid is provided for recording the examiner's evaluations. Five scoring options are available as follows. 1) NP = not performed - the

child does not demonstrate the criterion response; 2) NA = not applicable - the child is unable to demonstrate the criterion response due to a physical impairment; 3) I = independent - the child demonstrates the criterion response; 4) WA = with assistance - the child demonstrates the criterion response with mild assistance; 5) O = observed - the teacher or other informant reports that the child can perform the criterion response, although the response was not demonstrated during the testing session.

The general assessment procedure consists of the examiner presenting the tasks to a child, observing the child's response, rating this response and recording his rating on the test protocol. The administration time for the PMS varies between approximately one half hour and two hours. The exact amount of time required for assessment depends upon the particular child's attention span and functional level. A complete kit of materials has been developed to accompany the assessment instrument.

Several statistics have been computed on various parameters of the revised PMS. Interrater-reliability, which provides a measure of how well the criterion behaviors are defined in observable terms, was computed using a percentage of agreement method. An examiner and second observer simultaneously and independently rated a group of 10 multiply impaired blind children as the children were administered the revised PMS. The examiner and observer were both experienced at providing mobility instruction to lower functioning children. The obtained percentage of agreement was 92% which indicates that the revised PMS has high interrater-reliability.

A multiple linear regression analysis was computed on the PMS to determine the validity of the assumption that the motor, sensory, and concept sections of the Scale measure behaviors which are, in fact, prerequisites for mobility. The logic of this analysis was that if motor, sensory and concept skills are prerequisites for mobility, then a child's score on the mobility

section of the Scale sould be predictable on the basis of his scores on the first three sections of the PMS. For the purpose of this analysis, the four sections of the PMS were treated as 4 discrete scales. The mobility section of the scale was the criterion measure, and the motor, sensory, and concept sections were used as predictor variables. The PMS scores of 40 multiply impaired blind children were used as data for the regression analysis. These scores had been obtained during the pretesting phase of the Peabody Mobility Project. For a detailed description of the subjects and assessment procedures the interested reader is referred to Harley, 1976.

The results of the analysis of variance performed on the regression data is presented in Table 3. The results of the analysis indicated that a child's performance on the motor, sensory and concept portions of the PMS was a good predictor of his performance on the mobility section of the scale. The results support the contention that motor, sensory and concept skills are precursors to proficient independent travel.

Additional research is currently underway on the revised PMS. One study will evaluate the test-retest reliability of the instrument. Further research will investigate the relationship between the motor section of the PMS and other popular scales of fine and gross motor development. The final product of this research and development effort will be, it is hoped, a reliable, easily administered instrument for assessing Orientation and Mobility development in multiply handicapped children.

TABLE 3

SUMMARY

ANALYSIS OF VARIANCE
FOR P.M.S. REGRESSION DATA

SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F
REGRESSION	7001.05	3	408.68	11.998*
ERROR	1226.05	36	34.06	
TOTAL	8227.10	29		

*P = .01 SIGNIFICANCE LEVEL

TABLE 1

PEABODY MOBILITY SCALE

CATEGORY AND ITEMS

I. MOTOR DEVELOPMENT

1.1 BASIC MOVEMENT
1.2 CREEPING
1.3 STANDING
1.4 WALKING
1.5 ASCENDING STAIRS
1.6 DESCENDING STAIRS
1.7 RUNNING
1.8 JUMPING
1.9 CLIMBING

II. SENSORY SKILLS

2.1 SOUND LOCALIZATION
2.2 TACTUAL DISCRIMINATION (HANDS)
2.3 TACTUAL DISCRIMINATION (FEET)
2.4 OLFACTORY DISCRIMINATION

III. CONCEPT DEVELOPMENT

3.1 BODY IMAGE
3.2 SPATIAL RELATIONS (FRONT/BACK; UP/DOWN; ON/UNDER)
3.3 LEFT-RIGHT DISCRIMINATION
3.4 SHAPE DISCRIMINATION
3.5 SIZE DISCRIMINATION
3.6 ORGANIZATION

IV. MOBILITY SKILLS

4.1 SIGHTED GUIDE
4.2 SEATING
4.3 TURNING AND MAINTAINING ORIENTATION
4.4 TRAILING
4.5 UTILIZATION OF DISCRIMINABLE LANDMARKS
4.6 ENVIRONMENTAL TRAVEL

Table 2

1.4 Walking

Procedures: The Examiner takes the Child to an open area or hallway. E. demonstrates to the Child (by holding his hand and walking or moving with him) that there is nothing in his way. Follow the procedures for each item. Only minimal physical promts are permissable such as a slight touch on the shoulder, etc.

ASSESSMENT: Provide only as much assistance as necessary and score appropriately. If extensive physical prompting is required, score the item "NP".

1. Not performed
2. Not applicable
3. With assistance
4. Independent
5. Observed

		NP	NA	WA	
1.4.1.P. The Examiner supports the child under the child's armpits and says "Show me how you walk" (or a similar prompt). E. observes whether the child makes walking movements with his legs. If the child responds correctly to this item, proceed to 1.4.2.P. Otherwise, proceed to 1.5.	1.4.1.S. Child makes walking movements with support from another person (e.g., grasping child under armpits).				
1.4.2.P. The Examiner places the child next to a table or chair which he can use for support. The Examiner stands about 3 feet in front of the child and says "walk to me" (or a similar prompt). If the child responds correctly to this item, proceed to 1.4.3.P. Otherwise, proceed to 1.5.	1.4.2.S. Child makes "walking" movements with support of furniture.				
1.4.3.P. The Examiner stands about 4 feet in front of the child and says "walk to me" (or a similar prompt). If the child responds correctly to this item, proceed to 1.4.4.P. Otherwise, proceed to 1.5.	1.4.3.S. Child "walks" without support of objects using a wide base (feet turned out) with arms outstretched.				
1.4.4.P. Repeat the procedures of 1.4.3.P. Observe scoring criteria outlined in 1.4.4.S. If the child responds correctly to this item, proceed to 1.4.5.P. Otherwise, proceed to 1.5.	1.4.4.S. Child "walks" with erect posture, weight evenly distributed with toes pointed in direction of travel.				

Table 2 (con't)

		NP	NA	WA	I
1.4.5.P. The Examiner stands about 8 feet in front of the child and says "walk to me" (or a similar verbal prompt). Upon completion of this item, proceed to 1.5.	1.4.5.S. Child "walks" with a cross pattern with arms swinging at sides.				

COMMENTS: _____